

AMENDMENTS TO THE DRAWINGS

The drawing has been amended to delete the numbering “Fig. 1” from the sole figure of the drawing.

Attachment: Replacement Sheet 1 (one)

REMARKS

Claims 1 to 21 are all the claims pending in the application, prior to this Amendment.

Claims 1 to 4, 16 and 19 have been rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent 5,332,629 to Sumiya et al, or EP 0 407 946 A.

Applicants submit that Sumiya et al and EP 0 407 946 A do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claims 16 and 19 have been canceled, thus leaving claims 1-4 as being subject to this rejection.

The present invention, as set forth in claim 1 as amended above, is directed to a cubic boron nitride containing magnesium in an amount from 2×10^{-4} mol to 2×10^{-2} mol per 1 mol of cubic boron nitride, and having a toughness index in a range of 50 to 59.

Thus, applicants have amended claim to recite that the cubic boron nitride of the present invention has a toughness index in a range of 50 to 59. Support for the amendment to claim 1 can be found in the present specification at page 20, line 10 to page 21, line 3, and Table 1 at pages 22-23 of the specification.

The object of Sumiya et al is to obtain a sintered compact of cubic boron nitride having a high heat transmission property. In particular, Table 3 of Sumiya et al discloses sintered compact specimens, particle diameter of cubic boron nitride grains, Vickers hardness, and magnesium content of sintered compact specimens.

In the case of a sintered compact of cubic boron nitride, it can be generally estimated that most of the magnesium contents are distributed in intergranular regions. Thus, the amount of magnesium contained in the cubic boron nitride (crystal) cannot be found in Sumiya et al.

Moreover, Sumiya et al are silent about the toughness index, which is recited in amended claim 1. Therefore, the invention of amended claim 1 is not anticipated or rendered obvious by Sumiya et al.

EP 0 407 946 A also relates to a sintered compact of cubic boron nitride, and discloses a method for producing cubic boron nitride using a catalyst containing magnesium. EP 0 407 946 A, however, fails to disclose or suggest the amount of magnesium contained in cubic boron nitride recited in claim 1, namely, 2×10^{-4} mol to 2×10^{-2} mol per 1 mol, and fails to disclose or suggest the toughness index of the cubic boron nitride.

As can be seen from the above, the invention of amended claim 1 is not anticipated or rendered obvious by Sumiya et al or EP 0 407 946 A. Therefore, applicants submit that claim 1 and the claims dependent thereon are patentable over Sumiya et al and EP 0 407 946 A.

In view of the above, applicants submit that Sumiya et al and EP '946 do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

Claims 14, 15, 17, 18, 20 and 21 have been rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent to Sumiya et al, or EP 0 407 946 A.

Claims 17 to 21 have been canceled, thus leaving claims 14 and 15 as being subject to this rejection.

Dependent claims 14 and 15 depend, either directly or indirectly from claim 1, which now recites a toughness index. As stated above, neither Sumiya et al nor EP 0 407 946 A discloses or suggests an amount of magnesium contained in the cubic boron nitride of 2×10^{-4} mol to 2×10^{-2} mol per 1 mol, as recited in claim 1, and neither Sumiya et al nor EP 0 047 946 A discloses or suggests the toughness index of the cubic boron nitride. Accordingly, one of ordinary skill in the art would not have been led to the invention according to claims 14 and 15 based on either Sumiya et al or EP 0 407 946 A, or a combination thereof.

In view of the above, applicants request withdrawal of the rejection of claims 14 and 15 over Sumiya et al and EP 0 407 946 A.

Claims 5 to 13 have been rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent 5,837,214 to Shioi et al.

Applicants submit that Shioi et al do not disclose or render obvious the presently claimed invention of claims 5-13 and, accordingly, request withdrawal of this rejection.

Shioi et al disclose a method for producing cubic boron nitride. The object of Shioi et al is to obtain cubic boron nitride having sharp edges, which is different from that of the present application, which is to increase the phase transition ratio during production of cubic boron nitride while maintaining the number of defects, such as holes or the like in the crystal planes of the produced cubic boron nitride grains, to be small (by allowing use of more than 85 parts magnesium atoms by mole with respect to 100 parts of lithium atoms by mole in the synthesizing catalyst). In order to allow the use of more than 85 parts magnesium atoms by mole with respect to 100 parts of lithium atoms by mole in the synthesizing catalyst, claim 5 defines atomic

proportions of a lithium source, a magnesium source, and a carbon source in the catalyst for synthesizing cubic boron nitride.

Although Table 1 in Shioi et al discloses examples of a catalyst which contain lithium, magnesium, and carbon (Ex. 8, CaC_2 - LiNH_2 - $\text{Mg}(\text{NH}_2)_2$ (proportion: 4-5-5), Ex. 11, CaC_2 - LiNH_2 - MgNH (proportion: 4-5-5)), because Shioi et al fail to teach or suggest to increase the phase transition ratio during production of cubic boron nitride, these proportions would not have allowed a person of ordinary skill in the art to arrive at the atomic ratios recited in claim 5. Therefore, applicants submit that claim 5 and the claims dependent thereon are patentable over Shioi et al.

In view of the above, applicants submit that Shioi et al do not disclose or render obvious the presently claimed invention and, accordingly, request withdrawal of this rejection.

The Examiner has objected to the drawing and specification because they refer to “Fig. 1,” which is the sole drawing in the application. In response, applicants have amended the drawing and specification to correct this informality.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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